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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,130	10/01/2003	Bruce Hinton	NSD2002-013	3893

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EXAMINER	
GREENE, DANIEL LAWSON	

ART UNIT	PAPER NUMBER
3663	

DATE MAILED: 12/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	**Application No.** 10/677,130	**Applicant(s)** HINTON ET AL.	
	Examiner Daniel L. Greene Jr.	**Art Unit** 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-10* is/are pending in the application.

4a) Of the above claim(s) *6 and 7* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5 and 8-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's 10/3/2005 amendment to claim 1 has overcome the Examiner's Objection in section 3 and the Rejections of sections 6-8b and 8d of the 6/6/2005 Office action. Accordingly the issues in these regards only are hereby withdrawn.

Drawings

2. As indicated in the specification as filed page 2 lines 25-27, Figures 2 and 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.**

4. **Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

a. As explained in section 8c of the 6/6/2005 Office action, claim 3 is **still** vague, indefinite and incomplete. Claim 3 discloses a plurality of grooves axially extending in parallel along the penetration nozzle. The instant claim language does not specifically disclose **where** the grooves are and can be interpreted to mean the grooves are actually in the penetration nozzle itself, hence the metes and bounds of the claim are undefined.

b. Applicants 10/3/05 amendment introduced the limitation "spaced apart" to claim 1. Claim 1 is now considered vague, indefinite and incomplete in what all is meant by and encompassed by the phrase "having spaced apart convex surfaces" as the claim does not specifically state how far apart the convex surfaces can be to anticipate the claim. It is considered that the groove is defined by these convex surfaces, however the claim fails to disclose at what point the groove no longer is considered a groove but becomes an annular or semi annular space surrounding the penetration nozzle by defining how far said convex surfaces are "spaced". Since the limitation "spaced apart" connotes no particular distance, per se, the metes and bounds of the claim are undefined.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3, 5 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Saito et al. (5,267,279) or Sims (5,918,911) in view of either the Intergranular Stress Corrosion Cracking article or the definition of Stress corrosion and further in view of any of Norton (4,120,350), Franklin et al. (5,092,280) or Buford et al. (5,178,822).

Saito et al. in, for example, Figures 1, 3, and 6-10 and Sims in, for example, Figure 2 show it is old and well known in the nuclear field to have an annular space around nozzle penetrations of nuclear reactor pressure vessels to allow for coolant to leak out (Saito column 3 lines 5-19). Sims specifically teaches the use of leak paths including provisions for protecting said leak paths against corrosion in, for example, Figure 23, column 7 lines 47-59, column 8 lines 53-63 column 21 lines 15+ and column 22 lines 1-3 for the benefits of providing a visual indication of a leak allowing for rapid leak location detection and thus minimum loss of revenue due to lengthening down time for locating said leaks.

The discussion of intergranular stress corrosion cracking, ISCC, or IGSCC (There are many abbreviations known in the art) in the article by the same name from Structural Integrity Associates, Inc. is cited as evidence that the nuclear community is well aware of the ISCC phenomenon. This article provides a fair discussion of ISCC including that it "results from the localized attack of the grain boundaries in susceptible material in an aggressive environment under load" (Underlining added)

The Examiner's assertion that the topic of stress corrosion is in fact old and well known is further supported by the 1970 definition of Stress Corrosion on page 515 of the Dictionary of Nuclear Science and Technology, wherein it defines stress corrosion as "Chemical corrosion, such as that of reactor pressure vessels, that is accelerated by stress concentrations, either built in, or resulting from a load."(Underlining added)

Norton (see for example, Figures 2, 3 and 5, the second sentence of the abstract, column 2 lines 24-28, and column 3 lines 4-8), Franklin et al. (see for example Figure 4A and 4B) and Buford et al. all disclose the use of at least three inwardly protruding members that separate bights (reads on applicant's "grooves") as a method of restraining tube movement with the added benefit of minimizing flow restriction.

Norton, Franklin et al. and Buford et al. are considered analogous art because they indicate the general knowledge level of those in the nuclear power field with regard to a method of supporting a tube passing through an orifice and it is considered that penetration nozzles are analogous to and nothing more than tubes passing through the reactor pressure vessel instead of a heat exchanger tube passing through a support plate. Arguendo, if applicant is of the opinion that they are not analogous art, clearly those in the nuclear power field are aware of the different methods of supporting tubes passing through orifices

At the time of the invention, it would have been obvious to modify the annular space of either Saito or the prior art of Sims with the teachings of any of Norton, Franklin et al. or Buford et al. to include at least three inwardly protruding members in order to add mechanical support to the nozzle penetrating the reactor pressure vessel of either Saito or the prior art of Sims for the purpose of minimizing mechanical loads on said penetration nozzle in order to mitigate or minimize ISCC as taught by either the ISCC article or the definition of stress corrosion.

Further, it would have been obvious to maintain the leak path of Saito or Sims and minimize restrictions in said leak path to ensure that any leak that might occur is rapidly located for the benefit of minimizing lost revenue due to increased down time resulting from having to search for the leak.

Hence, with the modifications to either Sims or Saito, there would now be the structure recited in claims 1-3 as the convex surfaces are clearly shown in, for example, Franklin Figure 4A.

While patent drawings are not drawn to scale, relationships clearly shown in the drawings of a reference patent cannot be disregarded in determining the patentability of claims. See In re Mraz, 59 CCPA 866, 455 F.2d 1069, 173 USPQ 25 (1972).

Claim 5 is disclosed in, for example Saito et al Figure 1 wherein it is understood that forming of the weld (19) creates a counter bore because it is an inner end of the passageway and it does not matter how the counter bore is made, either by weld or drilling to assemble the parts. In any event, the manner of forming the counter bore is immaterial as the end result is that the passageway internal area closest the nozzles has been removed and replaced by weld material which reads on applicants counter bore.

Relating to claim 8, both the Sims and Saito references disclose reactor pressure vessel hemispherical head penetrations extending through said head.

Claim 9 is clearly disclosed in both Sims and Saito, as they are concerned with reactor pressure vessels, which are intended to contain radioactive fuel assemblies.

Regarding claim 10, Norton, column 3 lines 4-9 disclose that the depths of the individual bights enable the flow there through to be balanced, adjusted or otherwise manipulated to satisfy specific thermal and hydrodynamic requirements, hence for at least this reason it would have been obvious to vary the depth of each groove, however it would have also been obvious to one having ordinary skill in the art at the time the invention was made to vary the depth of each groove in an attempt to optimize the depth of the bights to within the range suggested to achieve a desired result, for example, minimize leak flow restrictions, minimize costs by minimizing structural material of the reactor pressure vessel, minimize thermal conductivity contact between the pressure vessel and nozzle penetration, etc. as such is no more in the basic engineering principles well known in the nuclear power field. Further it is well-settled that optimizing a result effective variable is well within the expected ability of a person of ordinary skill in the subject art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980), In re Aller, 220 F.2d 454, 105 USPQ 233 (CCPA 1955).

7. Claims 1-3, 5 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over APA (Admitted Prior Art) in view of Dau and the Leak-Before-Break Evaluation article in view of either the Intergranular Stress Corrosion Cracking article or the definition of Stress corrosion and further in view of any of Norton (4,120,350), Franklin et al. (5,092,280) or Buford et al. (5,178,822).

Per the specification page 2 line 25, Figure 2 of the instant application is APA.

Dau, column 1 lines 11-17 teach that it is old, well known and considered a basic nuclear engineering principle that, "Nuclear piping systems are designed under code provisions that reflect a "leak before break" philosophy. Piping is typically austenitic stainless steel and past service history has shown that through wall cracks will occur without serious treat to system integrity; i.e. the pipe breaking. Thus leak detection is an important method for detecting a fracture process in these piping systems" (Underlining added). This is considered evidence that leak detection is important and that Leak-Before-Break is a basic nuclear engineering principle because there are “code provisions” that reflect such a “philosophy”.

The importance of allowing leaks to be detected is further evidenced by the Leak-Before-Break (also known as LBB) Evaluation article by Structural Integrity Associates, Inc. “The concept of LBB implies that any crack or defect which develops in a component will grow to a through-wall configuration, and can be detectable by plant monitoring systems before reaching a size that would significantly reduce margins to component rupture” (Underling added). This article further discloses that this basic nuclear engineering principle is applied to nuclear power plants for the purpose of technical and economic benefits and that NUREG-1061, Vol. 3 provides the nuclear power community with evaluation methodology for LBB analysis. Clearly it would appear that if the Nuclear Regulatory Commission has regulations regarding LBB analysis, then it must be well known in the nuclear power industry.

The discussion of intergranular stress corrosion cracking, ISCC, or IGSCC (There are many abbreviations known in the art) in the article by the same name from Structural Integrity Associates, Inc. is cited as evidence that the nuclear community is well aware of the ISCC phenomenon. This article provides a fair discussion of ISCC including that it “results from the localized attack of the grain boundaries in susceptible material in an aggressive environment under load” (Underlining added).

The Examiner's assertion that the topic of stress corrosion is in fact old and well known is further supported by the 1970 definition of Stress Corrosion on page 515 of the Dictionary of Nuclear Science and Technology, wherein it defines stress corrosion as "Chemical corrosion, such as that of reactor pressure vessels, that is accelerated by stress concentrations, either built in, or resulting from a load."(Underlining added)

Norton (see for example, Figures 2, 3 and 5, the second sentence of the abstract, column 2 lines 24-28, and column 3 lines 4-8), Franklin et al. (see for example Figure 4A and 4B) and Buford et al. all disclose the use of at least three inwardly protruding members that separate bights as a method of restraining tube movement with the added benefit of minimizing flow restriction.

Norton, Franklin et al. and Buford et al. are considered analogous art because they indicate the general knowledge level of those in the nuclear power field with regard to a method of supporting a tube passing through an orifice and it is considered that penetration nozzles are nothing more than tubes passing through the reactor pressure vessel which is analogous to a heat exchanger tube passing through a support plate. Arguendo, if applicant is of the opinion that they are not analogous art, clearly those in the nuclear power field are aware of the different methods of supporting tubes passing through orifices

At the time of the invention, it would have been obvious to modify the APA with the teachings of either Dau or the LBB philosophy to include a leak path. It would have further been obvious to create said leak path using the teachings of any of Norton, Franklin et al. or Buford et al. to maintain at least three inwardly protruding members in order to add mechanical support (applicants own specification page 4 lines 7-9) to the nozzle penetrating the reactor pressure vessel for the purpose of minimizing mechanical loads on said penetration nozzle in order to mitigate or minimize ISCC, as taught by the ISCC article or the definition of stress corrosion.

Further, it would have been obvious to minimize restrictions in said leak path to ensure any leak that might occur is rapidly located for the benefit of minimizing lost revenue due to increased down time resulting from having to search for the leak, by removing as much material as possible from around the nozzle without sacrificing mechanical integrity or strength.

Hence, by modifying APA to include at least three bights, which reads on applicant's grooves, there now exits the structure recited in claims 1-3 as the convex surfaces are clearly shown in, for example, Franklin Figure 4A.

While patent drawings are not drawn to scale, relationships clearly shown in the drawings of a reference patent cannot be disregarded in determining the patentability of claims. See In re Mraz, 59 CCPA 866, 455 F.2d 1069, 173 USPQ 25 (1972).

Claim 5 is clearly disclosed in said APA Figure 2.

Claims 8 and 9 are disclosed in, for example, the specification as filed, page 3 lines 26+ and page 4 lines 1-19.

Regarding claim 10, Norton, column 3 lines 4-9 disclose that the depths of the individual bights enable the flow there through to be balanced, adjusted or otherwise manipulated to satisfy specific thermal and hydrodynamic requirements, hence for at least this reason it would have been obvious to vary the depth of each groove, however it would have also been obvious to one having ordinary skill in the art at the time the invention was made to vary the depth of each groove in an attempt to optimize the depth of the bights to within the range suggested to achieve a desired result, for example, minimize leak flow restrictions, minimize costs by minimizing structural material of the reactor pressure vessel, minimize thermal conductivity contact between the pressure vessel and nozzle penetration, etc. as such is no more in the basic engineering principles well known in the nuclear power field. Further it is well-settled that optimizing a result effective variable is well within the expected ability of a person of ordinary skill in the subject art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980), In re Aller, 220 F.2d 454, 105 USPQ 233 (CCPA 1955).

8. Claims 1-3, 5 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over basic nuclear engineering principles and methodologies notoriously well known in the nuclear power industry as evidenced by U.S. Patent 4,201,092 to Dau, Leak-Before-Break Evaluation by Structural Integrity Associates, Inc., Davis-Besse Reactor Vessel Head Degradation and the NRC Bulletin 2002-01.

It must be noted that the instant invention is considered as nothing more than a means to an end surrounding the basic nuclear engineering principle of "Leak before Break" notoriously well known in the nuclear industry and does not appear to further the nuclear power art or provide any patentable material.

It is old and well known and considered a basic nuclear engineering principle that, as shown in, for example U.S. Patent 4,201,092 to Dau column 1, lines 10-17, "Nuclear piping systems are designed under code provisions that reflect a "leak before break" philosophy. Piping is typically austenitic stainless steel and past service history has shown that through wall cracks will occur without serious treat to system integrity; i.e. the pipe breaking. Thus leak detection is an important method for detecting a fracture process in these piping systems" (Underlining added) This is considered evidence that leak detection is important and that Leak-Before-Break is a nuclear engineering principle because there are "code provisions" that reflect such a "philosophy".

The importance of leak detection is clearly evidenced by the discovery of the egregious degradation of the Davis Besse Reactor Vessel Head. See the NRC Bulletin 2002-01 and Davis-Besse Reactor Vessel Head Degradation web page at the Nuclear Regulatory Commission's web site that may have been mitigated if the leak before break methodology had been employed during the construction of this reactor.

The importance of allowing leaks to be detected is further evidenced by the Leak-Before-Break (also known as LBB) Evaluation article by Structural

Integrity Associates, Inc. "The concept of LBB implies that any crack or defect which develops in a component will grow to a through-wall configuration, and can be detectable by plant monitoring systems before reaching a size that would significantly reduce margins to component rupture" (Underling added). This article further discloses that this basic engineering principle is applied to nuclear power plants for the benefits of technical and economic benefits and that NUREG-1061, Vol. 3 provides the nuclear community with evaluation methodology for LBB analysis.

Clearly the examiner has set forth the underlying principle surrounding the instant invention, however as set forth above, such is no more than a basic engineering principle of which the nuclear power industry is fully aware. Consequently it must follow that any attempt to actually practice this methodology is inherently obvious no matter what physical form it may take.

Conclusion

9. Examiner's Note: Examiner has cited particular columns and line numbers in the references as applied to the claims for the convenience of the applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant, in preparing the responses, to fully consider the references in entirety as potentially teaching all or part of the claimed

invention, as well as the context of the passage as taught by the prior art or disclosed by the examiner.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hackworth and Hopkins show the importance of the leak before break principle and leak paths for leak detection respectively.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel L. Greene Jr. whose telephone number is (571) 272-6876. The examiner can normally be reached on Mon-Fri 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DIG
2005-12-14

JACK KEITH
SUPERVISORY PATENT EXAMINER